What is claimed is:

1.   A method of extending a spanning hierarchical protection tree in a mesh network comprising:

at a current node, receiving an invitation to become a child of a first adjacent node;

if a minimum capacity along a protection path from said current node to a root node of the spanning hierarchical protection tree which visits the first adjacent node is greater than a minimum capacity of any existing protection path from said current node to said root node:

designating said first adjacent node as a primary parent of said current node in said tree; and

from said current node, sending an invitation to become a child of said current node in said tree to each adjacent node of said current node that is not said first adjacent node.

2.   The method of claim 1, further comprising:

if said minimum capacity along said protection path from said current node to said root node which visits the first adjacent node is not greater than said minimum capacity of any existing protection path from said current node to said root node:

designating said first adjacent node as a backup parent of said current node in said tree.

3.   The method of claim 2, wherein said backup parent is one of a number of backup parents of said current node, each one of said number of backup parents having a priority based on a minimum capacity of a protection path from said current node to said root node which visits said one of said number of backup parents, with a higher minimum capacity being associated with a higher priority.

1   4.   The method of claim 3, further comprising ensuring that said designating
2   of said first adjacent node as a primary parent of said current node does not
3   introduce a loop into said spanning hierarchical protection tree.

1   5.   A method of reconnecting a node disconnected from a spanning
2   hierarchical protection tree in a mesh network to the spanning hierarchical
3   protection tree comprising:
4   designating a backup parent of said disconnected node in said tree to be a
5   primary parent of said disconnected node in said tree; and
6   from said disconnected node, sending an invitation to become a child of
7   said disconnected node in said tree to each adjacent node of said
8   disconnected node that is not said primary parent.

1   6.   A method of connecting an auxiliary node to a spanning hierarchical
2   protection tree in a mesh network comprising:
3   receiving an invitation from each adjacent node of said auxiliary node for
4   said auxiliary node to become a child of said adjacent node; and
5   designating as a primary parent of said auxiliary node the one adjacent
6   node that is visited by a protection path from said auxiliary node to a root
7   node of said spanning hierarchical protection tree whose minimum
8   capacity is at least as large as the largest minimum capacity of all existing
9   protection paths from said auxiliary node to said root node.

1   7.   A computing device comprising:
2   a processor;
3   memory in communication with said processor, storing processor readable
4   instructions adapting said device to extend a spanning hierarchical
5   protection tree in a mesh network by:
6   at a current node, receiving an invitation to become a child of a first
7   adjacent node; and
8   if a minimum capacity along a protection path from said current
9   node to a root node of the spanning hierarchical protection tree

10   which visits the first adjacent node is greater than a minimum

11   capacity of any existing protection path from said current node to

12   said root node, designating said first adjacent node as a primary

13   parent of said current node in said tree.

1   8.   The computing device of claim 7, wherein said instructions further adapt

2   said device to:

3   if said minimum capacity along said protection path from said

4   current node to said root node which visits the first adjacent node is

5   greater than said minimum capacity of any existing protection path

6   from said current node to said root node, send from said current

7   node an invitation to become a child of said current node in said

8   tree to each adjacent node of said current node that is not said first

9   adjacent node.

1   9.   The computing device of claim 8, wherein said memory further comprises

2   instructions adapting said device to:

3   if said minimum capacity along said protection path from said

4   current node to said root node which visits the first adjacent node is

5   not greater than said minimum capacity of any existing protection

6   path from said current node to said root node, designate said first

7   adjacent node as a backup parent of said current node in said tree.

1   10.   The computing device of claim 9, wherein said backup parent is one of a

2   number of backup parents of said current node, each one of said number of

3   backup parents having a priority based on a minimum capacity of a protection

4   path from said current node to said root node which visits said one of said

5   number of backup parents, with a higher minimum capacity being associated with

6   a higher priority.

1   11.   The computing device of claim 10, wherein said instruction further adapt

2   said device to ensure that said designating of said first adjacent node as a

3   primary parent of said current node does not introduce a loop into said spanning

4   hierarchical protection tree.

1   12.   A computing device comprising:

2   a processor;

3   memory in communication with said processor, storing processor readable

4   instructions adapting said device to reconnect a node disconnected from a

5   spanning hierarchical protection tree in a mesh network to the spanning

6   hierarchical protection tree by:

7   designating a backup parent of said disconnected node in said tree

8   to be a primary parent of said disconnected node in said tree; and

9   from said disconnected node, sending an invitation to become a

10   child of said disconnected node in said tree to each adjacent node

11   of said disconnected node that is not said primary parent.

1   13.   The computing device of claim 12, wherein said instructions further adapt

2   said device to:

3   for each said adjacent node:

4   if said minimum capacity along a protection path from said

5   auxiliary node to said root node of the spanning hierarchical

6   protection tree which visits said adjacent node is not greater

7   than said minimum capacity of any existing protection path

8   from said auxiliary node to said root node, designate said

9   adjacent node as a backup parent of said auxiliary node in

10   said tree.

1   14.   A computing device comprising:

2   a processor;

3   memory in communication with said processor, storing processor readable

4   instructions adapting said device to connect an auxiliary node to a

5   spanning hierarchical protection tree in a mesh network by:

6	receiving an invitation from each adjacent node of said auxiliary
7	node for said auxiliary node to become a child of said adjacent
8	node; and
9	designating as a primary parent of said auxiliary node the one
10	adjacent node that is visited by a protection path from said auxiliary
11	node to a root node of said spanning hierarchical protection tree
12	whose minimum capacity is at least as large as the largest
13	minimum capacity of all existing protection paths from said auxiliary
14	node to said root node.

1	15.	A computing device comprising:
2		a processor;
3		memory in communication with said processor, storing processor readable
4		instructions adapting said device to connect an auxiliary node to a
5		spanning hierarchical protection tree in a mesh network by:
6		requesting an invitation from each adjacent node of said auxiliary
7		node for said auxiliary node to become a child of said adjacent
8		node;
9		from each said adjacent node, receiving an invitation to become a
10		child of said adjacent node; and
11		for each said adjacent node:
12		if a minimum capacity along a protection path from said
13		auxiliary node to a root node of the spanning hierarchical
14		protection tree which visits said adjacent node is greater
15		than a minimum capacity of any existing protection path from
16		said auxiliary node to said root node, designating said
17		adjacent node as a primary parent of said auxiliary node in
18		said tree; and
19		from said auxiliary node, sending an invitation to become a
20		child of said auxiliary node in said tree to each further
21		adjacent node of said auxiliary node that is not said primary
22		parent adjacent node.

1   16.   A computer readable medium storing computer software that, when

2   loaded into a computing device, adapts said device to extend a spanning

3   hierarchical protection tree in a mesh network by:

4   at a current node, receiving an invitation to become a child of a first

5   adjacent node; and

6   if a minimum capacity along a protection path from said current node to a

7   root node of the spanning hierarchical protection tree which visits the first

8   adjacent node is greater than a minimum capacity of any existing

9   protection path from said current node to said root node, designating said

10   first adjacent node as a primary parent of said current node in said tree.

1   17.   The computer readable medium of claim 16, wherein said software is

2   further capable of adapting said device by:

3   if said minimum capacity along said protection path from said current node

4   to said root node which visits the first adjacent node is greater than said

5   minimum capacity of any existing protection path from said current node to

6   said root node, sending from said current node an invitation to become a

7   child of said current node in said tree to each adjacent node of said

8   current node that is not said first adjacent node.

1   18.   The computer readable medium of claim 17, wherein said software is

2   further capable of adapting said device by:

3   if said minimum capacity along said protection path from said current node

4   to said root node which visits the first adjacent node is not greater than

5   said minimum capacity of any existing protection path from said current

6   node to said root node, designating said first adjacent node as a backup

7   parent of said current node in said tree.

1   19.   The computer readable medium of claim 18, wherein said backup parent

2   is one of a number of backup parents of said current node, each one of said

3   number of backup parents having a priority based on a minimum capacity of a

4   protection path from said current node to said root node which visits said one of

5 said number of backup parents, with a higher minimum capacity being
6 associated with a higher priority.

1 20. The computer readable medium of claim 19, wherein said software is
2 further capable of adapting said device to extend a spanning hierarchical
3 protection tree in a mesh network by ensuring that said designating of said first
4 adjacent node as a primary parent of said current node does not introduce a loop
5 into said spanning hierarchical protection tree.

1 21. A computer readable medium storing computer software that, when
2 loaded into a computing device, adapts said device to reconnect a node
3 disconnected from a spanning hierarchical protection tree in a mesh network to
4 the spanning hierarchical protection tree by:
5   designating a backup parent of said disconnected node in said tree to be a
6   primary parent of said disconnected node in said tree; and
7   from said disconnected node, sending an invitation to become a child of
8   said disconnected node in said tree to each adjacent node of said
9   disconnected node that is not said primary parent.

1 22. The computer readable medium of claim 21, wherein said software is
2 further capable of adapting said device by:
3   for each said adjacent node:
4   if said minimum capacity along a protection path from said auxiliary
5   node to said root node of the spanning hierarchical protection tree
6   which visits said adjacent node is not greater than said minimum
7   capacity of any existing protection path from said auxiliary node to
8   said root node, designating said adjacent node as a backup parent
9   of said auxiliary node in said tree.

1 23. A computer readable medium storing computer software that, when
2 loaded into a computing device, adapts said device to connect an auxiliary node
3 to a spanning hierarchical protection tree in a mesh network by:

4   receiving an invitation from each adjacent node of said auxiliary node for

5   said auxiliary node to become a child of said adjacent node; and

6   designating as a primary parent of said auxiliary node the one adjacent

7   node that is visited by a protection path from said auxiliary node to a root

8   node of said spanning hierarchical protection tree whose minimum

9   capacity is at least as large as the largest minimum capacity of all existing

10   protection paths from said auxiliary node to said root node.

1   24.   A computer readable medium storing computer software that, when

2   loaded into a computing device, adapts said device to connect an auxiliary node

3   to a spanning hierarchical protection tree in a mesh network by:

4   requesting an invitation from each adjacent node of said auxiliary node for

5   said auxiliary node to become a child of said adjacent node;

6   from each said adjacent node, receiving an invitation to become a child of

7   said adjacent node; and

8   for each said adjacent node:

9   if a minimum capacity along a protection path from said auxiliary

10   node to a root node of the spanning hierarchical protection tree

11   which visits said adjacent node is greater than a minimum capacity

12   of any existing protection path from said auxiliary node to said root

13   node:

14   designating said adjacent node as a primary parent of said

15   auxiliary node in said tree; and

16   from said auxiliary node, sending an invitation to become a

17   child of said auxiliary node in said tree to each further

18   adjacent node of said auxiliary node that is not said primary

19   parent adjacent node.

1   25.   A computer readable medium storing computer software that, when

2   loaded into a computing device, adapts said device to extend a spanning

3   hierarchical protection tree in a mesh network by:

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4   at a current node, receiving an invitation to become a child of an adjacent

5   node, said invitation providing an indication of a minimum capacity of a

6   protection path from said current node to a root node of the spanning

7   hierarchical protection tree which visits the adjacent node; and

8   designating said adjacent node as a primary parent in said tree of said

9   current node if said indicated minimum capacity is greater than a minimum

10   capacity of any existing protection path from said current node to said root

11   node.

1 26.   A computer readable medium storing computer software that, when

2 loaded into a computing device, adapts said device to reconnect a node

3 disconnected from a spanning hierarchical protection tree in a mesh network to

4 the spanning hierarchical protection tree by:

5   designating a backup parent of said disconnected node in said tree to be a

6   primary parent of said disconnected node in said tree; and

7   from said disconnected node, sending an invitation to become a child of

8   said disconnected node in said tree to each adjacent node of said

9   disconnected node that is not said primary parent, said invitation providing

10   an indication of a minimum capacity of a protection path from said

11   adjacent node to a root node of the spanning hierarchical protection tree

12   which visits the disconnected node.

1 27.   A computer readable medium storing computer software that, when

2 loaded into a computing device, adapts said device to connect an auxiliary node

3 to a spanning hierarchical protection tree in a mesh network by:

4   receiving an invitation from each adjacent node of said auxiliary node for

5   said auxiliary node to become a child of said adjacent node, said invitation

6   providing an indication of a minimum capacity of a protection path from

7   said auxiliary node to a root node of the spanning hierarchical protection

8   tree which visits said adjacent node; and

9   designating as a primary parent of said auxiliary node one adjacent node

10   whose invitation indicates a minimum capacity at least as large as the

11   minimum capacity indicated in each other invitation.